Exhibit E
Bear Lake Road Improvement Project
Mitigation Measures

A. Topography, Geology and Soils

Mitigation measures to protect and preserve soil resources in the project area would be incorporated in the Landscaping/Revegetation Plan. Components of this plan include implementation of measures to minimize the loss of soil material before, during, and after construction. General erosion control measures would include minimizing the area of disturbance to defined construction limits and limiting the time soil is exposed. Suitable temporary sediment control measures such as silt fences, sediment traps, mulches, and logs would be used to contain soils within the project area until native vegetation is established.

No earthwork operations (excavation and embankment) would be allowed until after the removal of topsoil. Woody vegetation would be removed prior to topsoil salvage. Topsoil salvage methods include windrowing (3' high x 3' deep) topsoil at the limits of construction and placing the soil back on the finished slopes during reclamation. Topsoil should not be stockpiled over the winter. If topsoil must be stockpiled over the winter, it shall be seeded with sterile wheatgrass in September. Selective topsoil redistribution to soil deficient areas would be used as needed. Soil amendments, mulches and seeding would be selectively applied to match site conditions and revegetation goals. Long-term soil protection would come from prompt revegetation of disturbed areas following construction.

B. Water Resources

For reconstruction alternatives, best management practices (BMPs) would be used during and after construction to minimize erosion and prevent sediment-laden water from entering nearby streams. The Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (1996) would be used for reconstruction of the Bear Lake Road. In addition, the Park would prepare a detailed Landscape/Revegetation Plan that will provide long-term erosion control and stabilization of disturbed areas. Typical erosion control BMPs that would be used for this project are—

- No ground disturbing activities shall take place until sediment and erosion control features are in place.
- Filter barriers (silt fences, coir logs, tree trunks)
- Sediment retention structures (temporary and permanent sediment traps, sediment basins, check dams)
- Culvert outlet protection (riprap aprons or basins to reduce water velocity and prevent scour)
- Paved ditches or riprap lined ditches to prevent ditch scouring
- Retaining walls and cut walls to reduce cut slopes and the area of disturbance
- Revegetation of disturbed area
- Continued monitoring of water quality in Glacier Creek

- Ditch outlet protection (riprap waterways to reduce water velocity and prevent scour)
- Temporary berms and curbs to control runoff from the road surface and graded areas
- Erosion control blankets and mulch

C. Vegetation

The NPS would follow *RMNP Best Management Practices for Vegetation Restoration* (RMNP 2001) and implement a detailed Landscaping/Revegetation Plan to restore native vegetation to areas disturbed during construction. Mitigation to reduce impacts on vegetation resources and ensure revegetation of disturbed areas would include several measures. Principal mitigation components would include:

- Implementation of Best Management Practices to prevent wind and water erosion
- Salvage of topsoil and existing seed sources
- Implementation of landscaping design features, such as slope rounding, to minimize visual impacts and to aid in creating suitable site conditions for revegetation
- Application of topsoil and native seed and plantings according to site-specific conditions and vegetation communities
- Application of soil amendments, mulches, matting, organic matter, and other measures to facilitate revegetation
- Revegetation seeding and planting would use native species from genetic stocks originating in the Park. Plant species density, abundance, and diversity would be restored as nearly as possible to pre-construction conditions.
- Monitoring to evaluate vegetation cover and development of contingency and maintenance plans if vegetation cover is not similar to original ground cover

Additional measures to prevent the introduction and spread of noxious weeds during construction include:

- Implementation of a weed management plan in accordance with the Park's Exotic Plant Management Plan (NPS 2000) to prevent weed infestation and spread.
- Minimizing the area of disturbance and the length of time that disturbed soils are exposed
- Avoiding use of topsoil currently supporting exotic plants.
- Cleaning and inspecting construction vehicles prior to entering the Park to prevent the import of weeds from tires and mud on the vehicles
- Limiting the use of fertilizers that may favor weeds over native species
- Using periodic inspections and spot controls to prevent weed establishment. If weeds invade an area, use of an Integrated Pest Management (IPM) process to selectively combine management techniques to control the particular weed species.

D. Wetlands

All unavoidable impacts to wetlands would be mitigated by restoration of other disturbed wetlands within the Park. Proposed wetland mitigation includes the restoration of wetlands at the existing Glacier Creek Livery near Sprague Lake once this facility is relocated (Appendix A).

Additional mitigation measures to avoid and minimize direct and indirect impacts to wetlands would include:

- Placement of silt fence or other barriers adjacent to wetlands and streams to avoid direct impacts from construction equipment.
- Use of best management erosion and sediment control measures to prevent the introduction of sediments into wetlands and waters of the U.S.
- Maintaining the existing hydrologic connections between wetlands located on both sides of the road with culverts, subsurface drains, or other measures.
- Refining the road footprint during final design to reduce the total area of wetland disturbance.

E. Wildlife and Aquatic Resources

Mitigation and conservation measures would be incorporated into the selected alternative to minimize potential impacts on wildlife. These measures would be developed and implemented during final project design if a build alternative is selected. Mitigation measures applicable to minimizing wildlife habitat impacts and wildlife/vehicle collisions for all species is described below.

<u>Wildlife Habitat</u>

- Vegetation removal and disturbance will be confined to the specified construction limits for the project. All disturbed areas would be revegetated with native species.
- The clear zone in forested areas would be minimized.
- Construction activity between Trail Ridge Road and the Big Thompson River would not occur during the elk rut from September 15 to October 31.
- Snags and cavity nest trees would be avoided to the extent possible. If clearing is needed, cavity trees would be removed during the non-breeding season per the requirements of the Migratory Bird Treaty Act. No trees or snags that contain occupied bird's nests will be cut from March 1 through July 15.
- Migratory bird nests will be identified prior to ground disturbing activities.
- No blasting activity would occur within ½ mile (0.8 km) of the red-tailed hawk nest during the April to July 15 breeding season.
- Restoration of wetland areas at the Glacier Creek Livery stable near Sprague Lake would replace amphibian habitat impacted by road improvements.

<u>Aquatic Habitat</u>

- A stormwater management plan would be prepared for the Colorado Department of Public Health and Environment. BMPs would be used to minimize erosion and the introduction of sediments to aquatic habitat during and after construction.

- Any discharges of dredged or fill material into surface waters would be regulated under the 404 permitting process. All 404 permits require a Water Quality (401) Certification from the Colorado Department of Public Health and Environment before a 404 permit can be issued. The 401 certification would not allow discharges into surface water to result in any violations of applicable water quality standards and policies.
- On-going evaluation on the best use of traction sand and deicing products in the winter would seek to minimize the introduction of sands and deicing material into aquatic environments.
- Drainage improvements and installation of sediment traps would be used to capture road sand and erosion from runoff prior to discharge into streams.

Wildlife/Vehicle Collisions

- Posted speed limits would remain low (25 to 35 mph)
- Wildlife crossing signs and interpretive signs would be used to inform the public about the presence of wildlife.
- Pullouts would allow vehicles to stop and observe wildlife.
- Highly palatable plant species would not be planted adjacent to the road to minimize attracting wildlife.

F. Threatened, Endangered and Rare Species

Mitigation measures for threatened, endangered and rare species would be similar to those used to protect other wildlife, aquatic life, and wetlands. Other measures that would be incorporated into the final design if a reconstruction alternative is selected include:

- The clear zone in forested areas would be minimized to provide cover for lynx movement.
- Impacts on lynx prey species habitat such as snowshoe hare and squirrels would be minimized.
- Other restrictions in activities and visitor access would be considered if lynx become established in the Park.
- Best management erosion and sediment control measures would be used to prevent sedimentation of aquatic habitats used by greenback cutthroat trout and wetland habitats used by boreal toads.
- Lost wetland habitat would be mitigated by restoring previously damaged wetlands.
- Water quality monitoring would be used to identify potential problems during construction.
- Rare plants within the anticipated zone of disturbance would be transplanted to suitable locations.

G. Air Quality

All construction activities would be conducted in compliance with Colorado Department of Public Health and Environment requirements for construction-related fugitive dust. Dust abatement measures, such as watering unpaved disturbed areas, would be implemented. Disturbed areas would be revegetated as soon as possible after construction. Expanded shuttle bus service from the VTS to Bear Lake during construction would help reduce hydrocarbon emissions.

H. Natural Quiet, Sounds and Light

Information on construction zones would be made available to visitors so that they can plan their recreation activities accordingly.

I. Cultural Resources

Should any previously undiscovered archeological resource be discovered during construction, work would be stopped in the area of discovery and the Park archeologist contacted to assess the value of the find prior to resumption of the activity. If a significant resource were discovered, the Park would consult with the SHPO/Tribal Historic Preservation Officer, and the Advisory Council on Historic Preservation, as necessary. The NPS would ensure that all contractors are informed of the procedures to follow in case previously unknown archeological sites are uncovered during construction and the penalties for illegally collecting artifacts or intentionally damaging archeological resources. The prehistoric site (5LR604) near the VTS would be tested prior to expansion of the parking area to document the resource.

J. Visitor Use and Experience

Visitor inconvenience and public safety concerns would be minimized by a public information program alerting visitors to delays, closures, and road hazards. Most traffic delays would be limited to less than 30 minutes. Night closure and shoulder season construction would facilitate reconstruction work and reduce the total time necessary to complete construction and the time that visitors are inconvenienced. Access to Bear Lake would be maintained by expanded shuttle bus operation from the VTS during construction of the upper section of road. The Sprague Lake recreation area and livery stable would remain open to private vehicles throughout construction.

K. Visual and Scenic Resources

A number of methods would be incorporated into project design to improve the visual quality of the road. Retaining walls would be used wherever practicable to minimize the amount of surface disturbance and the creation of steep cut or fill slopes. Retaining walls would be constructed with materials to provide a natural looking rock surface. Timber guardrails would have a color and texture to blend with the environment. Slopes would be contoured to blend with surrounding topography and vegetation would be selectively cleared to create an irregular forest edge to create a diverse landscape appearance. Restoration and revegetation of disturbed areas would be the principal methods for mitigating construction-related disturbances to the

landscape. The Park would prepare a detailed Landscape/Revegetation plan to restore native vegetation to disturbed areas.

L. Local and Regional Economy

Mitigation measures would be similar to those discussed under *Visitor Use and Experience*. To assist local business owners and the traveling public with the delays and closures, the Park would develop a public information program as part of traffic management during construction. The Park would use various forms of communication, such as ads, signs, brochures, and the Internet, to inform road users and local businesses about the construction schedule and progress and the accessibility of recreation sites along Bear Lake Road during construction.